

# R4140 Automatic Programming Controls

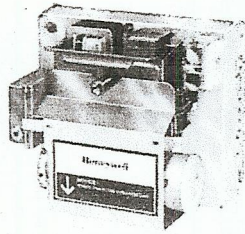
Provide flameout protection and automatic sequencing for commercial and industrial single or dual fuel burners.

- Directly replace R4150 for most applications; mount on same Q520A Subbase as R4150.
- Provide safety shutdown on flame failure (lockout).
- Safe-start check.
- Include sequence burner motor, firing rate motor (L and G only), ignition, pilot valve and main fuel valves.

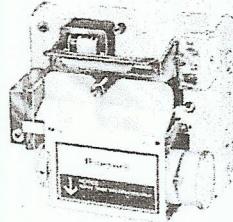
**APPROVALS:**

Underwriters Laboratories Inc. Listed: All R4140 except R4140G1114, G1122—File No. MP268, Guide Nos. MCCZ2, MCCZ.

Canadian Standards Association Certified: File No. LR1620, Guide Nos. 400-A-Z



R4140L



R4140G,M

Factory Mutual Approved: R4140G—Report No. 24180.  
R4140L—Report No. 24181. R4140M—Report No. 24150.  
Industrial Risk Insurers acceptable.

**ELECTRICAL RATINGS:**

Power Supply: 120 Vac (102 to 132V), 50/60 Hz.

Power Consumption: With no loads connected to output terminals—R4140L, 18W max.; R4140G,M, 13W max.; Maximum Total Connected Load, 2000 VA.

FLAME FAILURE RESPONSE TIME: 2 to 4 seconds (check specific amplifier).

TIMING, LOCKOUT SWITCH: 30 seconds, nominal.

PILOT FLAME ESTABLISHING PERIOD: 10 seconds.

**ACCESSORIES:**

118760B Remote Reset Cover.

123514A Flame Simulator (for use with R7247A,B Rectification Amplifiers).

123514B Flame Simulator (for use with R7249A Ultraviolet Amplifiers).

124731D Center terminal strip to adapt 13 terminal Q520As.

139695C Cover for 120V (Series 1 & 2).

202050C Cover for 120V (Series 3).

118760B Remote Reset Cover for 120V (Series 1 & 2).

*continued next page*

EPRI Edgemont Precision Rebuilders, Inc  
Matlack Industrial Center  
207 Carter Drive Unit C  
West Chester, PA 19382  
800-356-3774

# Programmers

R4140 continued

202051B Remote Reset Cover for 120V (Series 3).  
 FSP5004 R4150/R4140/BC7000 Tester (120V only). Provides a quick operational check of R4140<sup>a</sup>.  
 Q520A1089 Subbase (3-sided)—for mounting inside a suitable enclosure, 20 terminals.

Q520A1121 Subbase (4-sided)—serves as suitable wiring enclosure, 20 terminals.  
 Q520E1002 Service Tool—allows all programmer terminals to be monitored with the programmer operating.  
 W136A1045 Test Meter (includes 196146 Meter Connector Plug).

Available only through Honeywell Authorized Flame Safeguard Distributors.

Order Number <sup>a</sup>	Application	Interlock Circuits	Firing Rate Circuits	Pre-purge Timing	Flame Establishing Period	Timing, Early Spark Termination	Includes	Post-purge	Use With		
R4140G1015	Underwriters Laboratories Inc. Modulating (with Low-High-Low Pre-purge)	Start or Preignition, Running, and Low Fire	3-wire <sup>f</sup> or 4-wire	60 sec.	10 or 30 sec.	—		15 sec.	R7247, R7248 or R7249 amplifier and rectification, infrared or ultraviolet flame detector and Q520A Mounting Subbase.		
R4140G1064				60 sec.	109 sec.	5 sec.		15 sec.			
R4140G1106				60 sec.	10 or 15 sec.	—		15 sec.			
R4140G1114 <sup>b</sup>				70 sec.	10, 30 or 60 sec.	5 sec.		25 sec.			
R4140G1122 <sup>c</sup>				70 sec.	10, 30 or 60 sec.	5 sec.		25 sec.			
R4140G1148				60 sec.	10 or 15 sec.	5 sec.		15 sec.			
R4140G1171				70 sec.	10, 30 or 60 sec.	5 sec.		25 sec.			
R4140G1189 <sup>h</sup>				Preignition, Running, High Fire, Low Fire	4-wire	60 sec.	10 sec.	4 <sup>k</sup> sec.			15 sec.
R4140L1014	Factory Mutual/Industrial Risk Insurers Modulating with Low-High-Low Pre-purge and Proven High Fire Purge	Start and Running	3-wire <sup>f</sup> or 4-wire	60 sec.	10 or 15 sec.	—		15 sec.	R7247, R7248 or R7249 amplifier and rectification, infrared or ultraviolet flame detector and Q520A Mounting Subbase.		
R4140L1030 <sup>d</sup>				4-wire	60 sec.	10 sec.	4 <sup>k</sup> sec.			15 sec.	
R4140L1089 <sup>i</sup>					3-wire <sup>f</sup> or 4-wire	60 sec.	10 or 15 sec.	5 sec.			15 sec.
R4140L1105						60 sec.	10, 15 or 30 sec.	5 sec.			15 sec.
R4140L1147						60 sec.	10, 15 or 30 sec.	5 sec.			15 sec.
R4140M1012	Underwriters Laboratories Inc. On-Off	Start and Running	None		30 sec.	109 sec.	—		15 sec.	R7247, R7248 or R7249 amplifiers, Q520A1147 subbase.	
R4140M1020 <sup>e</sup>	Underwriters Laboratories Inc. On-Off (with 2-stage firing)	Start, Running and Low Fire	1-wire <sup>f</sup> (open damper contacts)	42 sec.	109 sec.	5 sec.	Cover	15 sec.			
R4140M1038 <sup>e</sup>				42 sec.	109 sec.	5 sec.		15 sec.			
R4140M1046 <sup>e</sup>				90 sec.	109 sec.	5 sec.	Cover	25 sec.			
R4140M1053 <sup>e</sup>				90 sec.	109 sec.	5 sec.		25 sec.			
R4140M1079 <sup>j</sup>	Underwriters Laboratories Inc. On-Off	Preignition, Running	None	90 sec.	10 sec.	4 <sup>k</sup> sec.		25 sec.	R7247, R7248 or R7249 amplifiers, Q520A1147 subbase		
R4140M1178 <sup>e</sup>	Underwriters Laboratories Inc. On-Off (with 2-stage firing)	Start, Running and Low Fire	1-wire <sup>f</sup> (open damper contacts)	96 sec.	109 sec.	5 sec.		25 sec.	R7247, R7248 or R7249 amplifier and rectification, infrared or ultraviolet flame detector and Q520A Mounting Subbase.		

<sup>a</sup> All models 120V, 60 Hz except R4140G1114 and R4140G1122. All models can be operated at 50 Hz; however, timings noted must be multiplied by 1.2.

<sup>b</sup> 240V, 60 Hz.

<sup>c</sup> 208V, 60 Hz.

<sup>d</sup> Timer cannot be rotated manually.

<sup>e</sup> Open Damper Pre-purge; Isolated Damper Motor Contact.

<sup>f</sup> Firing rate motor must close by itself (spring-return) when power is removed.

<sup>g</sup> Intermittent pilot terminal also available.

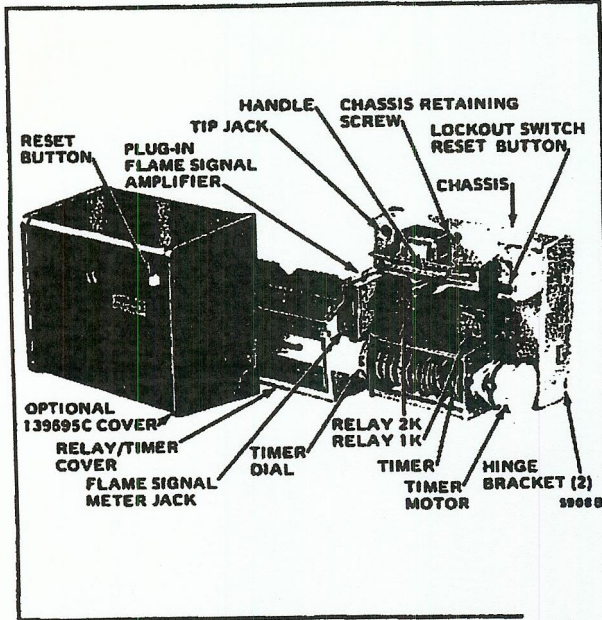
<sup>h</sup> Gordon Piatt special, GP201, available like for like exchange only.

<sup>i</sup> Gordon Piatt special, GP301, available like for like exchange only.

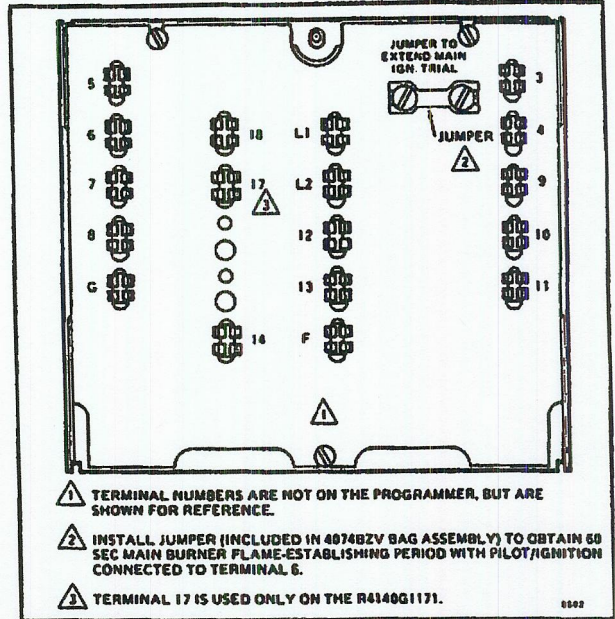
<sup>j</sup> Gordon Piatt special, GP101, available like for like exchange only.

<sup>k</sup> 4 sec. trial for main flame is obtainable for DSI oil applications.

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**PROGRAMMER COMPONENTS**



**REAR VIEW OF PROGRAMMER**

- ⚠ TERMINAL NUMBERS ARE NOT ON THE PROGRAMMER, BUT ARE SHOWN FOR REFERENCE.
- ⚠ INSTALL JUMPER (INCLUDED IN 407482V BAG ASSEMBLY) TO OBTAIN 60 SEC MAIN BURNER FLAME-ESTABLISHING PERIOD WITH PILOT/IGNITION CONNECTED TO TERMINAL 6.
- ⚠ TERMINAL 17 IS USED ONLY ON THE R4140G1171.

The R4140G1171 Flame Safeguard Programming Control is like the R4140G1049 model (120V, 60 Hz) except that—

- the timer cycle is 180 seconds instead of 120 seconds, so the Timer Sequence is different.
- it provides 30 or 60 seconds (field selectable) interrupted pilot/ignition at terminal 6. (See rear view above—30 seconds without the jumper; 60 seconds with the jumper.)

The R4140G1122 model is rated for 208V, 60 Hz. The R4140G1114 model is rated for 240V, 60 Hz. Neither the R4140G1122 nor the R4140G1114 can be used with the C7012E or F Purple Peepor Ultraviolet Flame Detector or with the R7247C Dynamic Self Check Amplifier. Otherwise, they are identical to the R4140G1171.

PROGRAMMER BEING REPLACED	WITH COVER	TIMER CYCLE (SEC)	PREPURGE (SEC)	EARLY SPARK TERMINATION	FLAME-ESTABLISHING PERIOD (SECONDS)		POSTPURGE (SEC)	FIRING RATE SWITCHING CIRCUIT	TRADELINE PROGRAMMER LIMITATIONS
					PILOT <sup>b</sup>	MAIN BURNER <sup>b</sup> (FIELD SELECTABLE)			
R4150G1103	No	120	60	No	10	10 or 30	15	3-wire	
R4150G1137	No	120	60	No	10	10 or 30	15	4-wire	
R4150H1002	No	120	30 <sup>a</sup>	No	10	15 or 60	15	3-wire	1
R4150H1036	No	120	30 <sup>a</sup>	No	10	15 or 60	15	3-wire	1, 2
R4150H1010	No	120	30 <sup>a</sup>	No	10	15 or 60	15	3-wire	1, 2, 3
R4140G1031	Yes	120	60	Yes	10	10 or 30	15	4-wire	
R4140G1049	No	120	60	Yes	10	10 or 30	15	4-wire	
R4140G1130	Yes	120	60	No	10	10 or 15	15	4-wire	
R4140G1148	No	120	60	No	10	10 or 15	15	4-wire	

<sup>a</sup> Low fire prepurge only.

<sup>b</sup> If using direct spark ignition of oil, the flame-establishing period is 10 seconds.

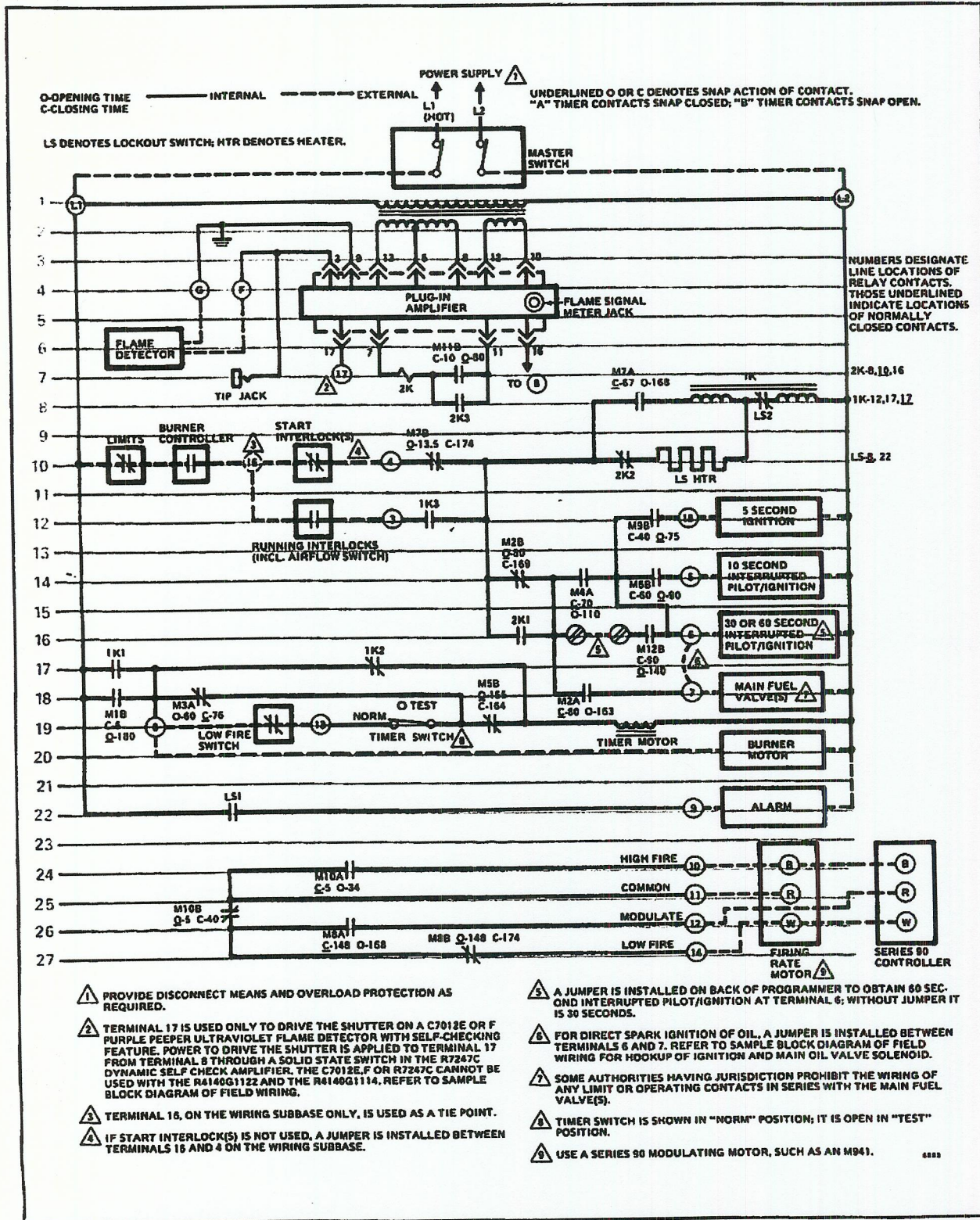
**LIMITATIONS**

- 1 Must rewire the modulation circuit. If programmer is mounted on a 15-terminal subbase, change it to a 20-terminal Q520. See Sample Block Diagram of Field Wiring on page 4.
- 2 Must use R4140G1122 (208 volt model).
- 3 Must use R4140G1114 (240 volt model).

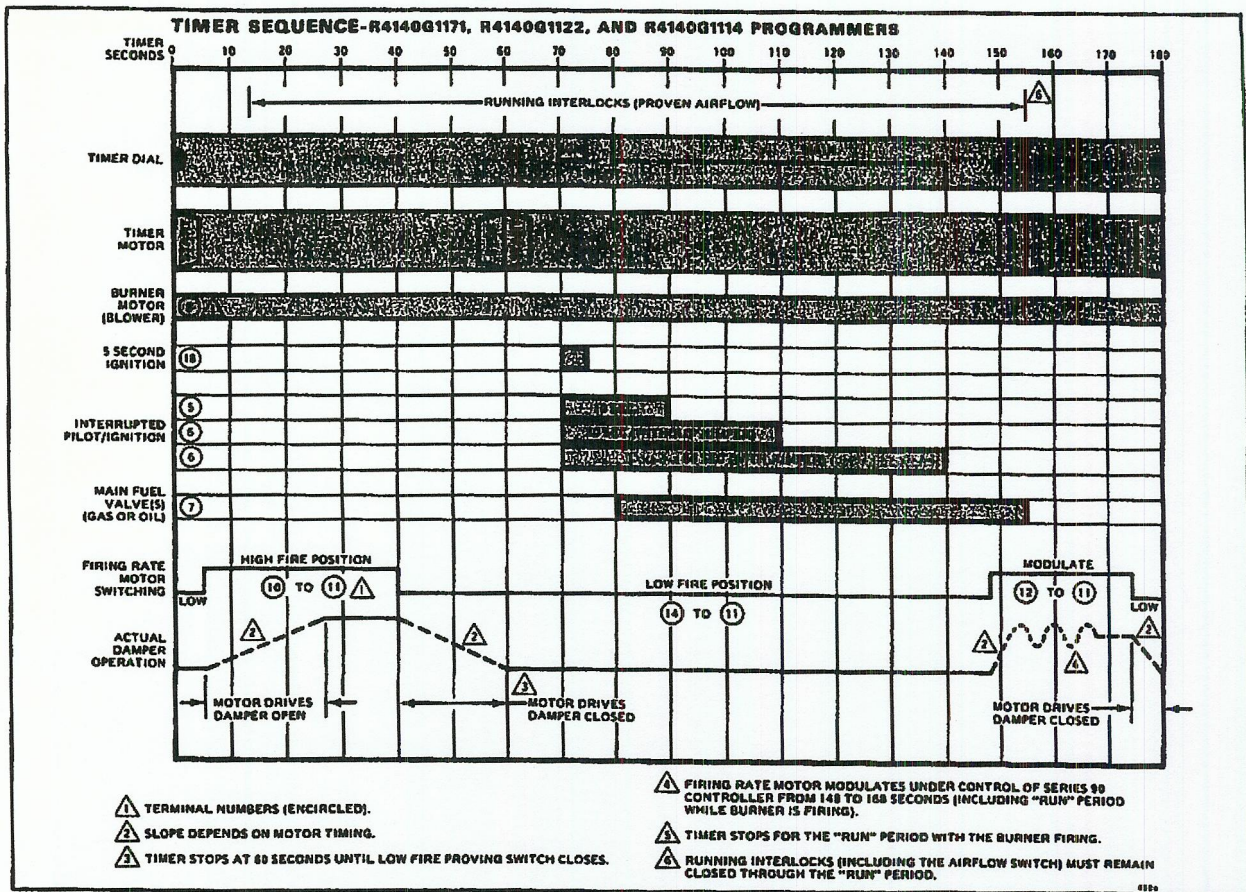
For additional specifications and instructions, refer to the R4140G instruction sheet, form 60-2337.

# OPERATION

The schematic below shows all contacts in the standby position (zero seconds). The opening and closing times are shown adjacent to each timer contact. Refer to the Timer Sequence chart and Step-By-Step Operation on the facing page.



**SIMPLIFIED SCHEMATIC DIAGRAM OF THE R4140G1171, R4140G1122, AND R4140G1114 PROGRAMMERS.**



## STEP-BY-STEP OPERATION (R4140G1171, R4140G1122, AND R4140G1114)

### START AND PREPURGE

**0 seconds**—On a call for heat, the burner controller contacts close. If the limits and start interlock(s) are closed, relay 1K pulls in through M7B, 2K2, the LS HTR (lockout switch heater—thus proving its continuity), and LS2.

—1K1 closes and 1K2 opens; timer starts (through M3A and M5B); power is applied to terminal 8, starting the burner motor (blower); 1K3 closes.

—Prepurge begins.

**5 seconds**—M10A closes, M10B opens; firing rate motor drives toward high fire position (open).

**6 seconds**—M1B closes, bypassing 1K1; the timer can complete its revolution if shutdown occurs.

**10 seconds**—M11B closes; flame relay 2K can pull in if a flame (or a condition simulating a flame) is detected. If detected during prepurge (until 67 seconds), 2K pulls in, 2K2 opens, 1K drops out, and the system will be shut down; the timer will complete its revolution and recycle the programmer.

**13.5 seconds**—M7B opens; running interlocks must be closed (airflow must be proven) or 1K will drop out, 1K3 will open, and ignition trials cannot be started. Running interlocks must remain closed through the "run" period or the system will be shut down; the timer will complete its revolution and recycle the programmer.

**40 seconds**—M10B closes; firing rate motor drives toward low fire position (closed).

**60 seconds**—M3A opens; timer stops until the low fire proving switch closes; timer can be stopped by opening the timer switch (until 76 seconds when M3A closes again).

**67 seconds**—M7A closes; the LS HTR (lockout switch heater) begins heating in preparation for ignition trials.

### IGNITION TRIALS

**70 seconds**—M4A closes; power is applied to terminals 18, 5, and 6, energizing the ignition transformer and pilot valve (and terminal 7, main oil valve solenoid, if using direct spark ignition of oil).

—When flame is detected, relay 2K pulls in, 2K2 opens, and the LS HTR stops heating; 2K1 and 2K3 close.

**75 seconds**—M9B opens; 5 second ignition (terminal 18) is de-energized (pilot only until 80 seconds).

**76 seconds**—M3A closes, bypassing the low fire switch and the timer switch.

**80 seconds**—M2B opens; pilot or ignition trial ends; flame must be detected by this time (2K pulled in and 2K1 closed) or safety shutdown will occur and the lockout switch will trip.

—M2A closes; power is applied to terminal 7, energizing the main fuel valve(s).

—M11B opens; prevents 2K from pulling in after this time.

**90 seconds**—M6B opens; 10 second interrupted pilot/ignition (terminal 5) is de-energized.

**110 seconds**—M4A opens; 30 second interrupted pilot/ignition (terminal 6) is de-energized if jumper has not been installed on back of programmer.

**140 seconds**—M12B opens; 60 second interrupted pilot/ignition (terminal 6) is de-energized if jumper has been installed on back of programmer.

**148 seconds**—M8A closes, M8B opens; firing rate motor is released to modulate under control of the series 90 controller.

**155 seconds**—M5B opens; timer stops with the system in the "run" condition.

### RUN PERIOD (burner is firing)

#### POSTPURGE AND STOP

**155 seconds**—When the operating set point is reached, the burner controller contacts open; relay 1K and the main fuel valve(s) (terminal 7) are de-energized.

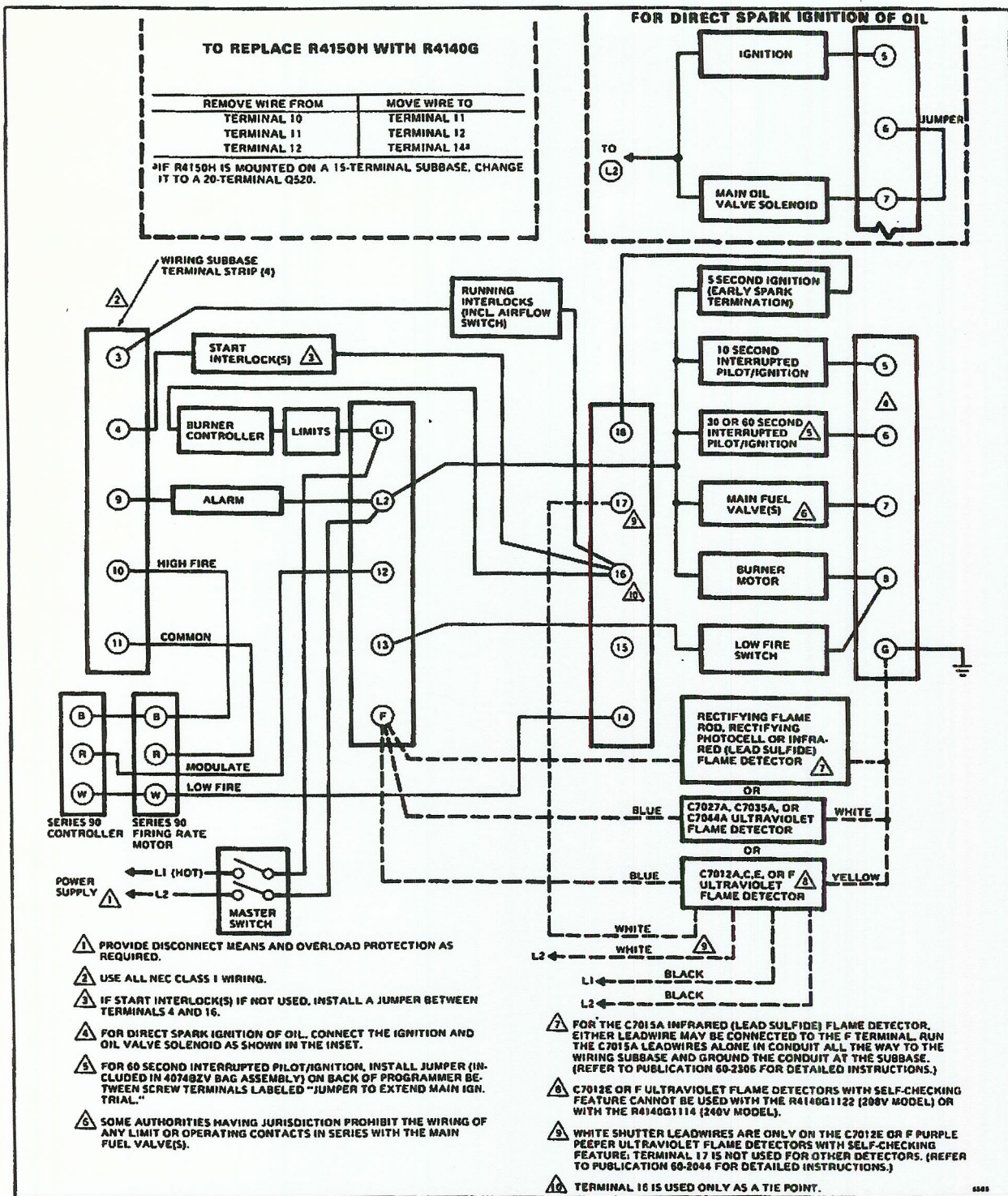
—1K2 closes; timer motor starts; postpurge begins.

—When flame goes out, relay 2K drops out.

**168 seconds**—M8A opens; firing rate motor stops modulating under control of the series 90 controller.

**174 seconds**—M8B closes; firing rate motor drives toward low fire position (closed).

**180 seconds**—M1B opens; timer and burner motor stop; end of cycle.



**SAMPLE BLOCK DIAGRAM OF FIELD WIRING FOR THE R4140G1171, R4140G1122, AND R4140G1114 PROGRAMMERS.**

For additional specifications and instructions, refer to the R4140G instruction sheet, form 60-2337.

**RESIDENTIAL DIVISION WARRANTY**

THE MAGNUSON-MOSS WARRANTY-FEDERAL TRADE COMMISSION ACT, DATED JANUARY, 1975, IMPOSES CERTAIN WARRANTY REQUIREMENTS ON "CONSUMER PRODUCTS" AS DEFINED THEREIN. THE SECOND PARAGRAPH OF THE FOLLOWING WARRANTY POLICY SHALL NOT APPLY TO "CONSUMER PRODUCTS" AFTER THE ACT BECOMES EFFECTIVE AS TO SUCH PRODUCTS. THE OTHER PROVISIONS OF THE POLICY ARE ALSO SUBJECT TO POSSIBLE MODIFICATION AS A RESULT OF THE ACT.

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If you have installed the product—then please refer to "INSTRUCTIONS—INSTALLING OR SERVICING CONTRACTOR OR DEALER."

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